11. (Twice Amended) A multi-layer foil comprising a copper metal layer having a shiny surface, and an electrically resistive composite material layer associated with the copper metal layer shiny surface wherein the electrically resistive composite material layer includes from about 0.01 to about 99.9 area % of a conductive metal other than copper and from about 0.01 to about 99.9 area % of particles of alumina; which multi-layer foil is formed by codepositing the electrically non-conductive particulate material and the electrically conductive material onto the copper metal layer by electrodeposition.

REMARKS

The examiner has rejected claims 22-23 under 35 U.S.C. 112, first paragraph. The examiner asserts that these claims contain subject matter which is not adequately described in the specification. Applicants respectfully submit that this is not the case. The examiner states that the specification does not teach *even dispersion* of a non-conductive particulate material within a conductive material, where the conductive material is present in 0.01%. Applicants respectfully submit that support for such an embodiment can be found in the specification on page 5, lines 14-16 which states that "It is preferred that the non-conductive material is a particulate material that can be *evenly dispersed* throughout the resistive foil material." The specification also states, on page 3, lines 25-31, that the electrically resistive co-deposited composite material layer includes from about 0.01 to about 99.9 area% of a conductive metal and from about 0.01 to about 99.9 area % of particles of a non-conductive material. The examiner points to Fig. 9, which shows a layer which predominantly comprises conductive material. Applicants wish to point out that this demonstrates only one possible embodiment of the invention, and does not serve to limit the scope of the invention to those which include more conductive material than non-conductive material. Applicants respectfully submit that the specification does indeed cover an embodiment wherein the conductive material is present in an amount of 0.01% and wherein it is evenly dispersed throughout the conductive material. A non-equal quantity amount or percentage of one material relative

to the other does not mean that one is not evenly dispersed with the other. Thus, it is respectfully urged that the 35 U.S.C. 112 rejection is improper and should be withdrawn.

The examiner has rejected claims 1-11 and 21-29 under 35 U.S.C. 102 over Hunt et al. Applicants respectfully assert that this ground of rejection has been overcome by the instant amendment. The claims now require that the electrically resistive composite material is formed by codepositing the electrically non-conductive particulate material and the electrically conductive material onto a substrate by *electrodeposition*. This is supported at page 7, line 11of the specification. Therefore, the amended claims now define:

> 1. An electrically resistive composite material consisting essentially of an electrically conductive material selected from the group consisting of antimony, arsenic, bismuth, cobalt, tungsten, manganese, lead, zinc, palladium, phosphorus, sulfur, carbon, tantalum, aluminum, iron, titanium, platinum, tin, nickel, silver, copper and combinations thereof, and an electrically non-conductive particulate material selected from the group consisting of silicon carbide, alumina, platinum oxide, tantalum nitride, talc, polyethylene tetrafluoroethylene, and mixtures thereof evenly dispersed throughout the conductive material; which electrically resistive composite material is formed by codepositing the electrically non-conductive particulate material and the electrically conductive material onto a substrate by electrodeposition.

Such a product, formed by electrodeposition is not found in any of the cited references.

Claims 1-11 and 21-29 stand rejected under 35 U.S.C. 102 (e) over Hunt, et al. It is respectfully submitted that this ground of rejection has been overcome by the instant amendment. Hunt et al. teaches a thin layer resistor comprising a layer of resistive material on an insulating substrate. However, Applicants urge that Hunt et al. fails to

teach *every aspect* of the claimed invention. Hunt et al. fails to teach an electrically resistive composite material which has been codeposited via electrodeposition, as required by the present claims. Indeed, Hunt et al. teaches a resistive material which may comprise a mixture of a conductive metal with a minor amount of a dielectric material. However, the material of Hunt et al. is formed by *combustion chemical vapor deposition*, rather than codeposition via *electrodeposition*, which is a key feature of the present invention. This technique produces a product which is very different from that produced by the applicants. It is submitted that the absence of this feature of the present invention from the cited reference renders the present invention patentably distinct from Hunt et al. It is therefore respectfully urged that the 35 U.S.C. 102 rejection has been overcome by the instant amendment and should be withdrawn.

The examiner has rejected claims 1-2, 4-5, 22-23, and 27 under 35 U.S.C. 102 over Tani et al. Applicants assert that this ground of rejection has been overcome by the instant amendment. Tani et al. relates to a resistance material comprising at least one resistance material of Ti, Mo, and W, and an inorganic binder. However, like Hunt et al., Tani et al. also fails to teach every aspect of the claimed invention. In particular, Tani et al. fails to teach an electrically resistive composite material as taught by the present invention, which is codeposited by electrodeposition. Rather, Tani et al. merely teaches a general application of a resistive paste material to a substrate, followed by a sintering or baking step. This technique produces a product which is very different from that produced by the applicants. It is submitted that Tani's failure to teach codeposition of the resistive material by electrodeposition renders the present invention patentably distinct from this reference. It is therefore respectfully urged that the 35 U.S.C. 102 rejection has been overcome by the instant amendment and should be withdrawn.

The examiner has rejected claims 1-5 and 21-23, and 27 under 35 U.S.C. 102 over Van Den Broek al. Applicants respectfully urge that this ground of rejection has been overcome by the instant amendment. Van Den Broek et al. relates to a thin-film resistor

and resistance material. However, Applicants submit that Van Den Broek et al., too, fails to teach every aspect of the presently claimed invention. Van Den Broek et al. fails to teach the electrically resistive composite material which is codeposited by *electrodeposition*. Rather, this reference teaches a resistance material which is *mixed, heat pressed and sintered* onto a metal substrate. This technique produces a product which is very different from that produced by the applicants. Applicants submit that the absence of the aforementioned features from Van Den Broek et al. renders the present invention patentably distinct from the cited reference. Applicants therefore respectfully request that this ground of rejection be withdrawn, as it has been overcome by the instant amendment.

The examiner has rejected claims 11 under 35 U.S.C. 102 over Yamada et al. It is urged that this ground of rejection has been overcome by the instant amendment. Yamada et al. teaches a conductive polymer composition which includes a crystalline polymer and large particles of carbon black. Applicants assert that Yamada et al. fails to teach every aspect of the claimed invention. Namely, Yamada et al. fails to teach an electrically resistive composite material which is codeposited by electrodeposition . Rather, Yamada et al. teaches a material which is extruded into a laminate sheet on a metal foil, and then annealed by a heat treatment under pressure at a temperature greater than the melting point of the polymer. This technique produces a product which is very different from that produced by the applicants. It is submitted that the absence of the aforementioned key features of the present invention from the cited reference renders the present invention patentably distinct from Yamada et al. Applicants therefore respectfully request that the 35 U.S.C. 102 rejection be withdrawn.

The examiner has rejected claims 6-11, 24-26 and 29 under 35 U.S.C. 103 over Van Den Broek et al. in view of either Clouser, Castonguay et al, or Lindblom et al. The examiner also makes an argument relating to XP-002121182. The examiner asserts that it would have been obvious for one skilled in the art to combine these references to produce the presently claimed invention. Applicants respectfully urge that this is not the case.

The arguments over Van Den Broek et al. are repeated from above and apply equally here. Van Den Broek et al teaches a resistance material which is *mixed, heat pressed and sintered* onto a metal substrate. The examiner has previously agreed that XP-002121182 fails to teach a foil conductive filler comprising copper, or a conductive metal layer or multilayer foil. The examiner has therefore cited Castonguay for teaching conductive metal foils. The examiner cited Clouser for teaching conductive fillers made of nickel or copper. The examiner also cited Lindblom for teaching the use of Invar having nickel. According to the examiner, it would be obvious for one skilled in the art to formulate the presently claimed invention upon a combined reading of Van Den Broek et al. with any of these references. Applicants urge that this position is unfounded. It is submitted that a combining of Van Den Broek et al. with any or all of these cited references would *still* fail to obviate the present claims. First, it is submitted that there is no teaching or suggestion in any of these references that would lead one to combine such references in an effort to devise the present invention. Furthermore, it is submitted that none of these references teach the electrically resistive composite material as taught by the present invention, which is *codeposited* via *electrodeposition*. Clouser employs electrodeposition, but his non-metallic material is not particulate. Clouser employs a *solution* containing *ionizable* acids and salts of nitrogen, phosphorus or sulfur containing compounds. (see col. 10, lines 25-68). Likewise, Castonguay, et al employs electrodeposition, but his non-metallic material is not particulate. Castonguay, et al deposit a solution of nickel, phosphorus and an oxide, hydroxide or peroxide of nickel. No particles are mentioned. Lindblom, et al employs a *sputtering* process rather than *electrodeposition*. With regard to XP-002121182, boron nitride does not form a par of these claims. It is therefore submitted that one skilled in the art would not be inspired to devise the presently claimed invention upon a combined reading of the cited references. Thus, Applicants respectfully urge that this ground of rejection is improper and should be withdrawn.

The undersigned respectfully requests re-examination of this application and believes it is now in condition for allowance. Such action is requested. If the examiner believes there

is any matter which prevents allowance of the present application, it is requested that the undersigned be contacted to arrange for an interview which may expedite prosecution.

Respectfully submitted,

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I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office (FAX No. 703-308-7722) on February 21, 2002.

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APPENDIX

MARKED-UP CLAIMS

1. (Twice Amended) An electrically resistive composite material consisting essentially of an electrically conductive material selected from the group consisting of antimony, arsenic, bismuth, cobalt, tungsten, manganese, lead, zinc, palladium, phosphorus, sulfur, carbon, tantalum, aluminum, iron, titanium, platinum, tin, nickel, silver, copper and combinations thereof, and an electrically non-conductive particulate material selected from the group consisting of silicon carbide, alumina, platinum oxide, tantalum nitride, talc, polyethylene tetrafluoroethylene, and mixtures thereof evenly dispersed throughout the conductive material; which electrically resistive composite material is formed by codepositing the electrically non-conductive particulate material and the electrically conductive material onto a substrate by electrodeposition.

11. (Twice Amended) A multi-layer foil comprising a copper metal layer having a shiny surface, and an electrically resistive composite material layer associated with the copper metal layer shiny surface wherein the electrically resistive composite material layer includes from about 0.01 to about 99.9 area % of a conductive metal other than copper and from about 0.01 to about 99.9 area % of particles of alumina; which multi-layer foil is formed by codepositing the electrically non-conductive particulate material and the electrically conductive material onto the copper metal layer by electrodeposition.